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Unreported ferns from Montana

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The state of Montana is located in such a position that it has not been adequately covered by any of the botanical "Manuals." In fact the work of botanical collectors has been more one of surrounding the state than of covering it. Coulter and Nelson's "New Manual of Rocky Mountain Botany" overlaps somewhat from the south, Piper's "Flora of the State of Washington" and Howell's "Flora of Northwest America" overlap from the west, and Bergman's "Flora of North Dakota" together with Britton and Brown's "Illustrated Flora" overlaps, to a less extent, from the east. The result is that, as the first four of these are comparatively local in the area covered, many Montana species have been entirely omitted from them. Their compilers have only mentioned the state of Montana incidentally to the discussion of the spread of species beyond the area under consideration. Rydberg's "Flora of Montana," published as Volume 1 of the Memoirs of the New York Botanical Garden, is a very comprehensive check list, although many of the very common species are not mentioned. This is due to the fact that it was based on a few scattered but large collections made on summer collecting trips. The fern list, although not complete, is fairly extensive, thanks to the very able collecting of R. S. Williams. Rydberg's more recent "Flora of the Rocky Mountains and Adjacent Plains" adds three fern species, previously unreported from the state, namely, *Asplenium Filix-foemina* (L.) Bernh. var. *cyclosorus* Rupr., *Polystichum munitum* (Kaulf.) Presl, and *Botrychium simplex* Hitchc. Why the first of these has remained so long unreported is hard to say as it is one of the most common of ferns to be met with along the mountain streams of western Montana, localities similar to those in which the typical form of the species is found. The second and third of the additions seem to be of rare occurrence each, so far as the writer is aware, being known from but one collection.

P. munitum was collected on Mount Aeneas in the Swan Range by D. T. MacDougal in 1901, and *B. simplex* Hitchc., by R. S. Williams at Columbia Falls in 1905. Well-preserved specimens from both these collections are in the herbarium of the University of Montana, and it seems strange that further collections of these species have not been made.

In glancing through the herbarium of the University of Montana, and that of the University of Montana Biological Station, the presence was noted of five ferns which, as yet, remain unreported from the state. Four of these belong to the Polypodiaceae, and the remaining one to the Ophioglossaceae. Though all of these are found in the western and mountainous portion of the state, four of the five are not reported by Coulter and Nelson for any part of the Rocky Mountain region. Three, moreover, are not to be found in Piper's manual. The addition of these five to those already known increases the total number of species and varieties of Montana pteridophytes to thirty-five, only two less than Piper reports for the state of Washington, and seven more than Coulter and Nelson attribute to the whole Rocky Mountain region.

1. OPHIOGLOSSUM VULGATUM L. Sp. Pl. 1062. 1753.

FLATHEAD COUNTY: Flathead Lake, Yellow Bay, August, 1916, A. W. L. Bray; July 1, 1917, P. W. Graff 1280, with young and immature sporangia; July 25, 1917, P. W. Graff 1397, a collection of mature specimens. The three collections were made at about 888 meters elevation.

These are the only collections of this rare fern which are known from Montana. They were made in the vicinity of the University of Montana Biological Station, at Yellow Bay on Flathead Lake, the second and third collections having been made along the margin of a meadow which is flooded during the season of high water, although surrounded by forest. During the months of May and June this meadow is a shallow pond to the forest border, but during the dry month of July it becomes an open field. The fern was found under the shadow of the overhanging branches of aspen and alder among the grass which had sprung up as the water receded. Numerous small patches were found on all sides of the meadow so that, in

this locality, it might almost be called abundant. In many instances there was associated with it the grape fern, *Botrychium silaifolium* Presl. This latter species, however, tended to grow farther into the forest, and was not confined to the grassy margin. The collection of the *Ophioglossum* is doubly interesting, since it seems to have escaped detection in the other Rocky Mountain states.

2. CYSTOPTERIS FRAGILIS (L.) Bernh. var. ANGUSTATA (Hoffm.) Luers. Farnpfl. 459. 1889.

GALLATIN COUNTY: vicinity of Bozeman, Mystic Lake, August 10, 1905, *J. W. Blankenship* 637, on cliffs at an altitude of 1800 meters.

This delicate variety is represented by but one collection in the herbarium of the University, although the typical form of the species is a very common fern throughout the western portion of the state, growing on rocky soil and in rocky crevices up to an altitude of about 3,000 meters. So far as I have been able to ascertain, the variety has not been reported from any of the region surrounding Montana. The specimen cited is as large as the typical form of the species, but the frond is much thinner and the pinnules are more toothed and finer-pointed. The following specimen in the herbarium of the University tends very strongly to approach this variety. Flathead County, vicinity of Bigfork, July 21, 1908, *M. E. Jones* 9739, at an elevation of 900 meters.

3. ASPIDIUM CRISTATUM (L.) Sw. Schrad. Jour. Bot. 1800²: 37. 1801.

FLATHEAD COUNTY: vicinity of Rost Lake, July 6, 1901, *D. T. MacDougal* 668, at an elevation of 975 meters.

This is the only collection of the crested shield fern from Montana, so far as known, two very good specimens being in the herbarium of the University of Montana. When further collections have been made, however, it seems probable that it will be found growing in the Glacier Park region, as well as in the Mission and Swan Mountains, if not further to the south and east.

4. *ASPIDIUM FILIX-MAS* (L.) Schrad. Jour. Bot. 1800²: 38. 1801.

GLACIER NATIONAL PARK: vicinity of Blackfoot Glacier, August 30, 1909. *M. E. Jones*. FLATHEAD COUNTY: north shore of Flathead Lake in the vicinity of Bigfork, July 20, 1908, *M. E. Jones* 9720, near the lake shore to the south of the town, at an elevation of about 888 meters. MISSOULA COUNTY: Mission Mountains, Lake Angus McDonald, June 23-24, 1901, *D. T. MacDougal* 367, on the shore of the lake at an elevation of 1,000 meters.

While indefinitely reported as found scatteringly through the western states, I have been unable to locate any definite report of this species from Montana. Rydberg, in his "Flora of Montana," reports it on hearsay but gives no record of any collection or collector. It seems to have been collected only in the mountainous western portion of the state, and there only to have been found sparingly. In the vicinity of Bigfork, at the northern end of Flathead Lake, it is locally abundant on the low lake shore. At the upper end of Lake Angus McDonald, under the dense shade of a grove of immense specimens of *Thuja plicata* D. Don, the giant cedar, and along the stream which feeds the lake, is a considerable bed of this fern. The species has been reported also from St. Mary's Lake (Sinyaleamin) in the Mission Mountains, and from several localities in the Bitter Root Valley, but I have seen no specimens from these places.

5. *ASPIDIUM SPINULOSUM* (O. F. Müller) Sw. var. *INTERMEDIUM* (Muhl.) D. C. Eaton; A. Gray, Manual, ed. 5, 665. 1867.

GLACIER NATIONAL PARK: Lake McDonald, August 25, 1909, *M. E. Jones*, at 950 meters elevation.

While the var. *dilatatum* (Hoffm.) Hook. has been reported previously from both Missoula County and to the northward, and the species proper from the Glacier Park region, the var. *intermedium* has remained unreported and has, so far as known, been collected but once. Both the species proper and this variety seem to be extremely rare in Montana.

The following table shows graphically the known distribution, in Montana and the surrounding states and provinces, of the five species enumerated in this paper, together with the three mentioned

in the introduction. It is evident that certain of these species should be found in those localities to the north and south of Montana, where similar mountainous conditions exist.

	Wash- ington	Oregon	Idaho	Wyoming	Colorado	North Dakota	South Dakota	Montana	British Columbia	Alberta
BOTRYCHIUM SIMPLEX.....				×	×			×	×	×
OPHIOGLOSSUM VULGATUM.....								×		
CYSTOPTERIS FRAGILIS var. ANGUSTATA ...		×	×					×		
POLYSTICHUM MUNITUM.....		×	×					×		
ASPIDIUM CRISTATUM.....			×			×		×		
ASPIDIUM FILIX-MAS.....		×	×		×		×	×	×	×
ASPIDIUM SPINULOSUM var. INTERMEDIUM.			×					×		
ASPLENIUM FILIX-FOEMINA var. CYCLOSORUS	×		×					×	×	×

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